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ABSTRACT

This book addresses questions of multiple representations in human reasoning and learning. Computational approaches to learning with multiple representations are introduced, and the role of multiple representations in teaching is discussed. The following chapters are included in Part I: Multiple Representations in Learning Concepts form Physics and Mathematics: (1) "Introduction" (Maarten W. van Someren, Henny P. A. Boshuizen, Ton de Jong and Peter Reimann) (2) "Acquiring Knowledge in Science and Mathematics: The Use of Multiple Representations in Technology-Based Learning Environments" (Ton De Jong, Shaaron Ainsworth, Mike Dobson, Anja van der Hulst, Jarmo Levonen, Peter Reimann, Julie-Ann Sime, Maarten W. van Someren, Hans Spada and Janine Swaak); (3) "Reasoning with Multiple Representations When Acquiring the Particulate Model of Matter" (Michael Rohr and Peter Reimann); (4) "How Beginning Students Use Graphs of Motion" (Eileen Scanlon); (5) "Toward Decision Support for Multiple Representations in Teaching Early Logic" (Mike Dobson); (6) "The Role of Prior Qualitative Knowledge in Inductive Learning" (Maarten W. van Someren and Huib Tabbers); (7) "Analysing the Costs and Benefits of Multi-Representational Learning Environments" (Shaaron E. Ainsworth, Peter A. Bibby and David J. Wood); Part II: Problem Solving and Learning with Multiple Representations: (8) "Problem Solving with Multiple Representations by Multiple and Single Agents: An Analysis of the Issues Involved" (Henny P. A. Boshuizen and Hermina J. M. (Tabachneck-)Schijf); (9) "Accidentology: An Example of Problem Solving by Multiple Agents with Multiple Representations" (Laurence Alpay, Alain Giboin and Rose Dieng); (10) "Perspective-Taking between Medical Doctors and Nurses: A Study on Multiple Representations of Different Experts with Common Tasks" (Rainer Bromme and Matthias Nuckles); (11) "One Person, Multiple Representations: An Analysis of a Simple, Realistic Multiple Representation Learning Task" (Hermina J. M. (Tabachneck-)Schijf and Herbert A. Simon); (12) "Using Multiple Representations in Medicine: How Students Struggle with Them" (Henny P. A. Boshuizen and Margaretha W. J. van de Wiel); (13) "Competence-Related Differences in Problem Representation: A Study in Physics

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Problem Solving" (Elwin R. Savelsbergh, Ton de Jong and Monica G. M. Ferguson-Hessler); (14) "A Utility-Based Approach to Speedup Learning with Multiple Representations" (Maarten W. van Someren, Pietro Torasso and Jerzy Surma); Part III: General Issues and Implications for Education: (15) "Multiple Representations and Their Implications for Learning" (Alan Lesgold); and (16) "Representation and Conceptualisation in Educational Communication" (Keith Stenning). (Contains 449 references.) (MES)

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